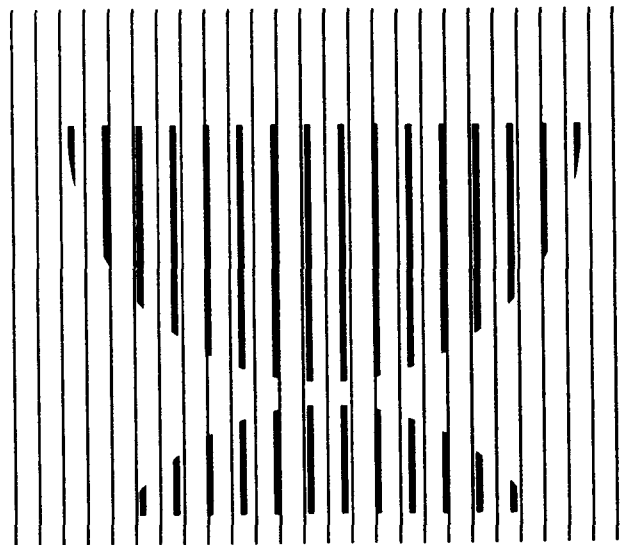


CBO STAFF MEMORANDUM

**THE BUDGETARY IMPACT OF LIMITING STRATEGIC DEFENSE
INITIATIVE PROGRAMS**

January 1992



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NOTES

Unless otherwise indicated, all years referred to in this memorandum are fiscal years, and all costs are expressed in constant 1992 dollars of budget authority.

Numbers in the text and tables may not add up to totals because of rounding.

The Strategic Defense Initiative (SDI) has been a controversial program from its inception. Critics and supporters have argued over the goals of the program and its chances of success. Under the Administration's plans, SDI also promises to become increasingly expensive during a period when the total defense budget may be reduced. In fact, for 1992 the Congress provided the highest-ever funding on antimissile defenses and, for the first time, set a target date for deploying a defense against long-range ballistic missiles. The Congress will therefore continue to confront difficult choices: how much to spend on SDI research and, if budgets are to be held down, which of various alternative programs to pursue.

This memorandum seeks to inform the Congressional debate on SDI by summarizing the Administration's SDI proposal and presenting three alternative programs, which vary widely in their costs and the defense capability that would result. In keeping with the mandate of the Congressional Budget Office (CBO) to provide objective analysis, the memorandum makes no recommendations.

The memorandum was researched and written by Raymond Hall of CBO's Budget Analysis Division, under the direction of Michael Miller, and David Mosher of the National Security Division, under the direction of Robert Hale. Raymond Hall organized the study and prepared all the cost estimates. David Mosher helped devise and analyze the options. Janice Johnson prepared the final draft for production.

INTRODUCTION

The Reagan Administration repeatedly made it clear that one of the basic goals of its Strategic Defense Initiative (SDI) was to protect the people of the United States from a large-scale nuclear attack. President Bush initially supported the Reagan Administration's goals for a system of strategic defenses. In the light of the dramatic changes in Eastern Europe and the former Soviet Union, however, President Bush recommended in his State of the Union address on January 29, 1991, that the SDI program be refocused, with emphasis on a revised policy objective: namely, protection against limited strikes. The resulting refocused SDI program is named Global Protection Against Limited Strikes (GPALS).

In the 1992 defense authorization bill, the Congress indicated it would support a less ambitious plan, but did not spell out all the details. That plan calls for deployment of 100 ground-based interceptors at Grand Forks, North Dakota, by 1996, or as soon as it is technologically feasible. The authorization bill also calls upon the Administration to try renegotiating the Anti-Ballistic Missile (ABM) Treaty with a view toward deploying a larger system of limited ground-based defenses.

The President's 1993 budget is expected to present a new Administration plan that would be consistent with the Congressional directive. This memorandum summarizes the Administration's SDI proposal that was

presented to the Congress in February 1991 and analyzes three alternative programs, which vary widely in their costs and defense capabilities. The first alternative is consistent with the 1992 defense authorization bill (including deployment by 1996), while the remaining two are more limited alternatives that the Congress might consider under severely constrained budgets.

THE ADMINISTRATION'S SDI PROGRAM

The GPALS concept is significantly different from earlier strategic defense concepts. Under GPALS, the defense system reportedly would be capable of assuring protection against limited strikes of up to 200 warheads and could be deployed by the year 2000.

The Administration has indicated that the GPALS program would deploy 1,000 space-based interceptors, 750 ground-based interceptors, 60 space-based sensors, six ground-based radars, and appropriate command and control centers sometime after 1998. Several of the elements in the GPALS plan have new names but are derived from strategic defenses discussed in early SDI reports. These elements are:

- o Brilliant Pebbles (BP), a space-based interceptor;

- o Brilliant Eyes (BE), a space-based surveillance and tracking system;
- o a ground-based interceptor;
- o a ground-based Exo- and Endoatmospheric Interceptor;
- o a ground-based radar; and
- o a ground-based surveillance tracking system, consisting of ground-based radars and sensors, and command centers.

In addition to these global space- and ground-based missile defenses, the Defense Department is also pursuing development of ground-based missile defenses designed to serve a theater of operations. The near-term goal is to deploy these theater defenses by the mid-1990s, and to use the components as the basis for a global protection system. One system under consideration is an improved version of the existing Patriot missile--the "SCUD-buster" of the Persian Gulf War. Other missile defense designs being developed include the Arrow missile (a long-range weapon for area defense, developed jointly by the United States and Israel), and its succeeding Arrow Continuation Experiments; a wide-area, high-altitude interceptor and sensor, developed in the United States and known as the theater high-altitude area

defense system; and a "hit-to-kill" autonomous missile called the extended-range interceptor.

Based on budget documentation submitted with the Administration's February 1991 plan, and illustrated in Table 1, the cost of GPALS programs from 1993 through 2005 would be approximately \$63 billion in 1992 dollars, including about \$20 billion in research costs, roughly \$9 billion for the Brilliant Pebbles space-based interceptors, \$22 billion for ground-based systems and their guidance and tracking satellites, and \$12 billion for theater missile defenses.

Phase I Defenses and Ensuing Research

The Administration still envisions deploying more BP interceptors, BE satellites, and ground-based components, possibly as early as 2005. The components included in this deployment are jointly called Phase I defenses. The Phase I concept would focus on deterring massive, deliberate attacks of 1,000 or more warheads. The Phase I plan would be significantly larger than the GPALS structure, consisting of possibly 4,000 BP interceptors, 2,000 ground-based interceptors, 260 BE space-based sensors, ground-based radars, and appropriate command and control centers.

TABLE 1. ACQUISITION COSTS OF THE ADMINISTRATION'S SDI PROGRAM
(By fiscal year, in billions of 1992 dollars of budget authority)

Programs	1993	1994	1995	1996	1997	Total 1993-1997	Total 1993-2005
Global Protection Against Limited Strikes (GPALS)							
Research ^a	1.8	2.0	2.1	1.8	1.7	9.4	20.3
Space-based elements	0.6	0.5	0.8	1.1	1.3	4.3	9.4
Ground-based elements ^b	1.1	1.0	1.4	1.3	1.6	6.4	21.7
Theater defenses ^c	<u>1.1</u>	<u>1.6</u>	<u>1.8</u>	<u>1.7</u>	<u>1.6</u>	<u>7.8</u>	<u>11.9</u>
Total GPALS	4.6	5.1	6.1	5.9	6.2	27.9	63.3
Phase I Defenses ^d	0.0	0.0	0.0	0.0	0.0	0.0	6.7
Second-Generation Research	<u>1.0</u>	<u>1.1</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>	<u>5.1</u>	<u>18.1</u>
Total SDI	5.5	6.2	7.1	7.0	7.1	32.9	87.5

SOURCE: Department of Defense budget documentation from the Strategic Defense Initiative Organization office.

NOTE: SDI = Strategic Defense Initiative; Phase I = deployment of more space- and ground-based components to protect against large-scale attacks.

- a. Includes GPALS-related research costs not directly associated with specific space, ground, or theater programs.
- b. Includes military construction costs.
- c. Includes Tactical Missile Defense Initiative costs.
- d. Phase I deployment continues beyond 2005 and total costs are estimated to be more than \$20 billion.

In addition to the \$63 billion required to develop and deploy specific programs under the GPALS scheme, current plans call for \$7 billion by 2005 to begin deploying Phase I and \$18 billion to continue funding technologies that support the development of weapons as successors to GPALS and Phase I. Thus, the total cost of the SDI through 2005 comes to about \$88 billion (see Table 1).

During the negotiations of the recently completed Strategic Arms Reduction Talks (START) Treaty, senior White House officials indicated that the Administration might be willing to accept limits to SDI as long as GPALS plans were not limited. These reports seem to indicate that the Administration might also forgo deployment of Phase I defenses. As noted earlier, however, the savings through 2005 that might be realized by relinquishing Phase I deployment are only \$7 billion, with no savings achieved by 1997.

ALTERNATIVES THAT LIMIT SDI

In the next few years, the Congress may consider spending much less for research and production on strategic defenses than the roughly \$6 billion a year that the Administration projected last February, even without Phase I deployment. Although 1992 funding is the highest ever for SDI--\$4.2 billion--

continued pressure to reduce the budget deficit will probably lead to lower defense spending. Major reductions in funding for strategic defense would probably require changing its mission. The greatly diminished threat of nuclear war resulting from reduced tensions between the United States and the former Soviet republics will also prompt reconsideration of nuclear forces and strategic defenses. Although it will take a few years for the governments in the newly independent republics to stabilize, U.S. military strategists will know how the threat has changed long before any defensive system can be deployed.

1992 Defense Authorization Policy

The Congress has indicated that the United States intends to deploy an anti-ballistic missile system, including an adequate number of ABM sites and space-based sensors. The system would be capable of providing a highly effective defense of the United States against limited attacks of ballistic missiles, including accidental or unauthorized launches or Third World attacks. To attain this goal, the Congress directed the Administration to pursue development of a technologically feasible antiballistic missile system that complies with the ABM treaty for deployment at a single site by the earliest date, as the initial step toward installing the SDI program. The single site would most likely be located at Grand Forks, North Dakota, and would

include 100 ground-based interceptors, plus fixed ground-based radars and space- and ground-based sensors.

In addition to requiring the Administration to plan for this initial deployment, the Congress also urged the President to discuss with the former Soviet Union amendments to the ABM treaty that would permit additional ABM sites and ground-based interceptors, and to allow deployment of space-based interceptors.

The manner in which the 1992 authorization bill for SDI is put into effect will also affect the size and shape of strategic defenses in the future. Defense could be limited to the small system that was approved under the initial steps of the bill. But if the ABM treaty is revised and the Congress approves further deployments, the 1992 authorization bill could eventually lead to deployment of a larger system of defenses, perhaps one that has many of the features of the Administration's proposed GPALS. There is still wide disagreement in the Congress, however, about whether a larger system of defenses should include such features as the space-based interceptors (Brilliant Pebbles) that are part of the Administration's version of GPALS.

This memorandum presents an alternative that probably is consistent with the 1992 authorization bill (including deployment by 1996), and discusses two other alternatives that the Congress might consider under severely

constrained budgets. Any system capable of intercepting only a few hundred warheads is considered a limited defense. Theater missile defenses, as proposed by the Administration, would be deployed for each alternative. The planned level of defenses for each of these alternatives is described in Table 2.

This staff memorandum focuses only on the costs of these alternative approaches and does not analyze their ability to counter future missile attacks. Also, the 1993 budget is expected to present a new Administration plan that would be consistent with the Congressional directive. The analysis of costs and savings in this staff memorandum is based on costs in the plan that the Administration submitted in February 1991, and will be updated upon release of the Administration's new budget proposals.

Alternative I: Deploy a Multiple-Site, 750-Interceptor ABM Protection System

One of the problems of strategic defenses is that potential adversaries may respond by deploying more missiles to overwhelm them. For instance, during the signing of the START treaty, Soviet officials stated that if the United States were to deploy strategic defenses, the former Soviet Union would feel compelled to withdraw from the treaty in order to deploy more missiles. On

TABLE 2. U.S. STRATEGIC DEFENSE SYSTEMS UNDER ALTERNATIVE MISSIONS

Mission	Type of Defense ^a	Number of		Space- Based Sensors	Ground- Based Radars	Deploy Phase I?	Continue Funding of Research and Development for	
		Space	Ground				GPALS Systems?	Succeed- ing Systems?
The Administration's Plan and Variant								
The Administration's Plan	Large-scale ^b	4,000	2,000	260	12	Yes	Yes	Yes
The Administration's Plan Without Phase I	GPALS	1,000	750	60	6	No	Yes	Yes
Alternative Missions								
I. Do Not Deploy Phase I, Ban Brilliant Pebbles	Limited GPALS	0	750	60	6	No	Yes	No
II. No Space-based Components, Do Not Deploy Phase I, Restrict to a Single Site, Limit R&D	Limited GPALS	0	100	0	1	No	Yes, limited	No
III. Do Not Deploy Any Weapons, Limit R&D	Theater Only	0	0	0	0	No	Yes, limited	No

SOURCE: Congressional Budget Office based on data from the Strategic Defense Initiative Organization.

NOTE: GPALS = Global Protection Against Limited Strikes; Phase I = first stage of a large defense system against a ballistic missile attack; Brilliant Pebbles = space-based interceptors.

a. Theater missile defenses would be deployed under all missions.

b. The Administration's plan would deploy the Global Protection Against Limited Strikes system before deploying a large-scale defense.

the one hand, deployment of defenses could obstruct arms control. On the other, an effective system of defenses could reduce the risk of limited attacks.

Alternative I is a limited defense system that could allow arms control and provide protection from small-scale missile attacks. The ground-based portion of GPALS would be allowed, although spaced-based weapons would be banned. In addition, ground-based interceptors and radar systems would be allowed little mobility, so that they could be used only against an accidental launch. Furthermore, developing and deploying defenses such as advanced interceptors and laser weapons would not be permitted.

This system of defenses could be considered consistent with the 1992 authorization bill. The Congress directed the Administration to renegotiate the ABM treaty so that it would permit deployment of this kind of substantial system of defenses. In addition, this alternative assumes elimination of space-based interceptors, which were controversial during negotiations over the bill. Renegotiating the ABM treaty, however, may be difficult in view of events in the former Soviet Union. Also, further approval from the Congress would be necessary to deploy this system of defenses.

As shown in Table 3, total funding through 1997 would amount to about \$24 billion. Proposed spending through 2005 would amount to about \$54 billion.

TABLE 3. ACQUISITION COSTS OF ALTERNATIVE STRATEGIC DEFENSE PROGRAMS
(In billions of 1992 dollars of budget authority)

Programs ^a	1993	1994	1995	1996	1997	Total 1993-1997	Total 1993-2005
Program Costs							
SDI with Phase I ^b	5.5	6.2	7.1	7.0	7.1	32.9	87.5
Alternative I: Deploy a Multiple Site, 750-Interceptor, ABM Protection System	4.0	4.6	5.3	4.8	4.9	24.0	53.9
Alternative II: Deploy a Single Site, 100-Interceptor, ABM Protection System	3.1	3.5	4.0	3.7	3.4	17.7	36.4
Alternative III: Maintain a Hedge ^c	2.3	2.8	3.0	2.9	2.8	13.7	27.5
Savings from Alternatives							
Alternative I: Deploy a Multiple Site, 750-Interceptor, ABM Protection System	1.5	1.6	1.8	2.2	2.2	8.9	33.6
Alternative II: Deploy a Single Site, 100-Interceptor, ABM Protection System	2.4	2.7	3.1	3.3	3.7	15.2	51.1
Alternative III: Maintain a Hedge ^c	3.2	3.4	4.1	4.1	4.3	19.2	60.0

SOURCE: Congressional Budget Office.

NOTE: ABM = antiballistic missile; Phase I = deployment of more space- and ground-based components to protect against large-scale attacks.

- a. Theater missile defenses would be deployed under all missions.
- b. Phase I deployment continues beyond 2005 and total costs are estimated to be more than \$20 billion.
- c. Includes \$1.2 billion annually in Strategic Defense Initiative research and development activities, plus all theater missile defenses.

This alternative would save about \$9 billion through fiscal year 1997. Total savings through 2005 from Alternative I would be \$34 billion; \$9 billion as a result of canceling Brilliant Pebbles, \$7 billion from not deploying Phase I, and about \$18 billion from terminating second-generation research.

Alternative II: Deploy a Single Site, 100-Interceptor ABM Protection System

Although differences remain, the Congress and the Administration seem to agree about the need for limited defenses designed to protect the United States against an accidental or unauthorized nuclear attack. These defenses, however, would require substantial funding that may not be available during the next few years. This option would respond to tightened budgets by reducing the potential size of the strategic defenses.

The ballistic missile defense concept proposed under this alternative would consist of many of the ground-based components developed under the Administration's plan, except that many fewer weapons would be deployed. Specifically, this option would deploy 100 ground-based interceptor anti-ballistic missiles, one ground-based radar, and appropriate command and control centers. It would continue GPALS research, possibly leading to development and deployment of more GPALS components, but would limit annual funding to a reduced level of \$1.2 billion.

This option is consistent with the first steps of the 1992 authorization bill, except that initial deployment of the strategic defenses would not happen until after 1996.

As shown in Table 3, total funding through 1997 would amount to about \$18 billion. Proposed spending through 2005 would amount to about \$36 billion.

This alternative would save about \$15 billion through 1997. Total savings through 2005 from Alternative II would be \$51 billion; \$17 billion more than Alternative I. Of the additional \$17 billion savings, \$13 billion is saved by deploying significantly fewer weapons than those currently planned under GPALS. The remaining savings come from limiting GPALS research to only \$1.2 billion a year.

Alternative III: Maintain a Technology Base

The least expensive of the three alternatives examined in this memorandum would provide a hedge for the United States in case the former Soviets deployed their own widespread system of strategic defenses. Alternative III would not deploy any strategic defenses, but would maintain a technology base and allow the United States to develop weapon and sensor technologies. As

in Alternative II, the United States would provide annual funding of \$1.2 billion to maintain this technology base.

This last alternative is clearly not consistent with the 1992 authorization bill, which at a minimum called for deployment of a small system of defenses. This final alternative might, however, be consistent with the sharp cuts in overall defense funding that could occur during the next few years.

Including the funding requirements for theater missile defenses, total funding through 1997 would amount to about \$14 billion. Proposed spending through 2005 would amount to about \$28 billion.

This alternative would save about \$19 billion through 1997. Total savings through 2005 from Alternative III would be more than \$60 billion; \$53 billion from canceling all of the GPALS architecture, except the theater missile defenses, and \$7 billion from not deploying Phase I.

